REMARKS

Please reconsider the application in view of the following remarks. Applicant thanks the Examiner for carefully considering this application, and indicating that claims 7-12 contain allowable subject matter.

Disposition of Claims

Claims 1-17 are pending in this application. Claims 1 and 13 are independent. Claim 6 has been amended. Claims 2-12 depend, directly or indirectly, from claim 1.

Claim 6 has been amended to more clearly recite that an aperture stop may be provided in at least one diffraction plane between the object area and the image area. No new matter has been added. The amendment has not been made for reasons relating to patentability.

Rejection under 35 U.S.C § 112

Claim 6 stands rejected under 35 U.S.C. § 112, second paragraph, as being indefinite. The claim has been amended to clarify the location of the diffraction plane. However, with regard to antecendent basis, the rejection is respectfully traversed.

The applicant believes that the phrase "at least one diffraction plane" does not lack antecedent basis. As shown in Figure 2, two diffraction planes are formed between the object plane and the image plane. A diffraction plane is formed between the object plane (27) and the intermediate image plane (59). Another diffraction plane is formed between the intermediate image plane and the image plane (31). According to an embodiment of the invention, an aperture stop (61) may be located between the first

focusing lens device and the intermediate image plane. Those skilled in the art will appreciate that other embodiments can be devised. For example, another embodiment of the invention may include an aperture stop between the intermediate image plane and the image plane. Moreover, two aperture stops may be included between the object area and the image area. For example, an aperture stop may be located between the first focusing lens device and the intermediate image plane and another aperture stop may be located between the intermediate image plane and the image plane. Thus, the language "at least one diffraction plane" is believed to be appropriate.

In light of the above, the withdrawal of the rejection is respectfully requested.

Rejection(s) under 35 U.S.C § 102

Claims 1-6 and 13-17 stand rejected under 35 U.S.C. § 102 as being anticipated by U.S. Patent No. 5,973,333 (Nakasuji). This rejection is respectfully traversed.

Embodiments of the present invention relate to a lens arrangement (and a method for manufacturing such an arrangement) that provides for a reduction in aberrations. In particular, embodiments of the present invention provide a lens arrangement for the particle-optical imaging of an object, where the lens arrangement comprises a first focusing lens device and a second focusing lens device as well as a deflection device.

As recited in claim 1, a first focusing lens is provided for imaging an object area into an intermediate image area. A second focusing lens is then provided for imaging the intermediate image area into an image area. This arrangement forms an intermediate image between the first and second focusing lenses.

In addition, in order to reduce aberrations of the first and/or second focusing lens

devices, claim 1 recites that a deflection device be disposed in a region of the intermediate image area. Therefore, the deflection device provides for a field having a deflecting effect on imaging particles in the region of the intermediate image area. This deflecting effect causes the intermediate image to "tilt" prior to being imaged by the second focusing lens. Accordingly, aberrations which result into a tilt of the image area relative to a nominal image area can be compensated for. In particular, these aberrations are referred to in the art as "image field curvature."

Advantageously, therefore, the structure recited by claim 1 (and, correspondingly, found in claim 13) provides for an improved imaging apparatus as compared to prior art structures.

In contrast to the above, Nakasuji discloses a first lens 15 and a second lens 19 for imaging an object plane M into an image plane W. The first and second lenses (15, 19) are arranged such that an intermediate image is not formed between the lenses. An octopole lens 18 is disposed at a cross over formed between the first and second lenses.

As those having ordinary skill in the art will appreciate, a cross over and an (intermediate) image in an optical system are completely different elements. Imaging an object into an image or intermediate image requires that position information at the place of the object is transformed into position information at the place of the image or intermediate image. Figure 1 of Nakasuji shows two rays of the beam crossing the object plane M at two different distances from the optical axis, where both are parallel to the optical axis. These two rays carry positional information of the object. At the cross over 17, this positional information is transformed into angular information because the two rays intersect with the optical axis at different angles. No positional information of the

object plane is available in the plane of the cross over 17 because the rays intersect at a single point. In the image plane W, the two rays are separated to form an image of the object plane M, which means that the position information of the object plane is transferred to the image plane W.

The Applicant respectfully notes that those having ordinary skill in the art of optics would never identify a cross over with an image plane. The cross over is, in fact, positioned at a diffraction plane, which is conjugate to an image plane. Positional information of an image plane is transformed to angular information at the diffraction plane and vice versa (*i.e.*, angular information at the image plane is transformed to positional information at the diffraction plane). This latter relationship is not evident from Figure 1 of Nakasuji because only rays crossing the object and image planes at an angle of zero with respect to the optical axis are shown therein.

Turning to Figure 2 of the present invention, by way of example, an object plane 27 is imaged into an intermediate plane 59. This is evident from the three rays shown in the figure. The central ray shown in unbroken lines starts at the object plane at a distance from the optical axis and at an angle of zero with respect to the optical axis. The rays shown in broken lines start from the object plane 27 at the same position but at different angles as compared to the central ray. These three rays then intersect at the intermediate image plane 59 (as shown moving from left to right across Figure 2). Thus, the position information of the object plane is reconstructed at the intermediate image plane 59, and a sharp image is produced. The three rays intersect again in the (final) image plane 31, such that the object plane 27 is finally imaged into the image plane 31.

Accordingly, in the embodiment shown in Figure 2, a cross over and diffraction

plane is formed between the object plane 27 and the intermediate image plane 59 at the position where the central ray shown in full line crosses the optical axis. In certain embodiments of the invention, an aperture stop may be placed at this location. Thus, it appears that the rays starting at the object plane 27 at different angles but at the same location cross the intermediate image plane at different positions (the angular information of the object plane having been transformed to positional information at the diffraction plane).

A further cross over and diffraction plane is formed between the intermediate image plane 59 and the image plane 31 at the position where the central beam (shown as an unbroken line) crosses the optical axis again. Another aperture may be located at this position.

According to basic optics, image planes and diffraction planes are alternately disposed along the optical axis in an imaging optical system. Because there are two cross overs shown in the embodiment of Figure 2, it follows that one intermediate image is formed in between the two cross overs.

In contrast, because there is only a single cross over formed between the object plane and the image plane of Nakasuji, it is impossible that an intermediate image be formed between the object plane and the image plane.

As such, Nakasuji cannot show or suggest the feature of the present invention (recited in independent claims 1 and 13) wherein an intermediate image is formed. As mentioned before, in Nakasuji's lens arrangement it is impossible that an intermediate image be formed between the object plane and the image plane.

In view of the above, Nakasuji fails to show or suggest the present invention as

recited in claims 1 and 13. Thus, the claims are patentable over Nakasuji. Dependent claims are allowable for at least the same reasons. Accordingly, withdrawal of this rejection is respectfully requested.

Applicant believes this reply is fully responsive to all outstanding issues and places this application in condition for allowance. If this belief is incorrect, or other issues arise, the Examiner is encouraged to contact the undersigned or his associates at the telephone number listed below. Please apply any charges not covered, or any credits, to Deposit Account 50-0591 (Reference Number 03850.017001).

Respectfully submitted,

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